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EXAMINER	
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ART UNIT	PAPER NUMBER
2136	

NOTIFICATION DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/716,429	NOMIZU ET AL.	
	Examiner	Art Unit	
	Eleni A. Shiferaw	2136	

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *20 November 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *02/20/2004 and/or 11/20/2003* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *See Continuation Sheet*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Continuation of Attachment(s) 3). Information Disclosure Statement(s) (PTO/SB/08), Paper No(s)/Mail Date :02/04/2005, 04/16/2004,and 02/20/2004.

DETAILED ACTION

Claims Status

1. Claims 1-20 are presented for examination and pending.

Drawings

2. New corrected drawings in compliance with 37 CFR 1.121(d) are required in this application because figures 8A and 8B require **legend**. The applicant for the patent is required to furnish a drawing for his or her invention where necessary for the **clear understanding** of the subject matter sought to be patented. The requirement for corrected drawings will not be held in abeyance.

Information Disclosure Statement

3. The information disclosure statement filed on 4/16/047, the 77 pages reference, has not been considered because applicant fails to submit an English translation.

3.1 The information disclosure statement filed on 02/04/05, under list of related cases, has been considered but not initialized and dated because applicant failed to use a 1449 form so the examiner can initial the IDSs submitted.

3.2 The information disclosure statement filed on 02/20/2004, under list of related cases, has been considered but not initialized and dated because applicant failed to use a 1449 form so the examiner can initial the IDSs submitted.

Claim Objections

4. Claims 1, 2, 3, 13, 15, 16, 17, and 19 are objected to because of the following informalities: there should not be a period in the middle/body of the claims. The sixth limitation

of claims 1, 2, and 3. Limitation 5 of claims 13 and 19, limitation 8 of claims 15, 16, and 17 should not have ended with period before the end of the claim. Appropriate correction is required.

Claim Rejections - 35 USC § 101

5. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

6. Claims 1-3 and 13 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. The claims state an apparatus the their preamble but all the limitation disclosed are modules inside the body of the claims.

7. Independent claims 15-17, and 19 and their dependent claims are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.
It is not tangibly embodied as it is software per se. It is suggested that the claimed subject matter "A code stream producing program installed ..." of claims 15-17 should be changed to "A code stream producing program stored ...", an "An image processing program installed..." of claim 19 should be changed to "An image processing program stored..."

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

9. Claims 1-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Venkatesan et al. USPN 10187073 in view of Kamijoh et al. USPN 09764628.

Regarding claim 1, Venkatesan et al. discloses a code stream producing apparatus comprising:

a quantizer (fig. 4 element 450) that quantizes a frequency component obtained from a pixel value of an image through discrete wavelet transform to produce a set of quantized coefficients or each of a plurality of tiles of the image (col. 9 lines 45-60);

a block processing unit that divides the set of quantized coefficients into a plurality of blocks (col. 5 lines 14-23, and col. 6 lines 30-50);

a hash conversion unit that carries out hash conversion for each of the blocks, based on the quantized coefficients of the block, to obtain an encoding hash value for each of the blocks (col. 9 lines 2-53); and

a bit plane defining unit that divides each of the blocks into a plurality of bit planes (col. 11 lines 25-30, and col. 5 lines 14-23).

Venkatesan et al. does not explicitly disclose a digital watermarking unit that adjusts an ON/OFF state of significant bits such that the relation between information defined by N (N is an even number) significant bits Qnm(x, y) (x=0, 1, . . . , y=0, 1, . . .) of the m.sup.th bit plane of the n.sup.th block and a natural number T satisfies either the ON state expressed by equation (1), or the OFF state expressed by equation (2), depending on whether the encoding hash value of the n.sup.th block is odd or even, in order to embed a digital watermark; and an encoding unit that encodes the set of quantized coefficients containing the ON/OFF adjusted significant bits; and applicant's equation (1) and (2).

However Kamijoh et al. teaches a method that does not lose verification information, such as copyright information, embedded in image data, even when the image data are quantized for compression by using adjustment means for adjusting the value of the image data whose form has been changed and repeating the adjustment process until quantized values are not changed by errors that are introduced through the predetermined process (see col. 1 lines 57-col. 2 lines 50, fig. 5 and element 332 of fig. 5, and equations 1-15) that reads on a digital watermarking unit that adjusts an ON/OFF state of significant bits such that the relation between information defined by N (N is an even number) significant bits Qnm(x, y) (x=0, 1, . . . , y=0, 1, . . .) of the m.sup.th bit plane of the n.sup.th block and a natural number T satisfies either the ON state expressed by equation (1), or the OFF state expressed by equation (2), depending on whether the encoding hash value of the n.sup.th block is odd or even, in order to embed a digital watermark; and an encoding unit that encodes the set of quantized coefficients containing the ON/OFF adjusted significant bits and applicants equations 1 and 2.

Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention was made to modify the teachings of Kamijoh et al. within the system of Venkatesan et al. because they are analogous embedding information in a digital data using quantized coefficients. One would have been motivated to modify the teachings of Kamijoh et al. because it would provide durable digital watermark technique and/or embedded watermark would not be lost (see Kamijoh et al. col. 4 lines 6-10, and col. 1 lines 6-10).

Regarding claim 2 Venkatesan et al. discloses a code stream producing apparatus comprising:

a quantizer (fig. 4 element 450) that quantizes a frequency component obtained from a pixel value of an image through discrete wavelet transform to produce a set of quantized coefficients for each of a plurality of tiles of the image (col. 9 lines 45-60);

a block processing unit that divides the set of quantized coefficients into a plurality of blocks (col. 5 lines 14-23, and col. 6 lines 30-50);

a hash conversion unit that carries out hash conversion for each of the blocks, based on the quantized coefficients of the block, to obtain an encoding hash value for each of the blocks (col. 9 lines 2-53);

a bit plane defining unit that divides each of the blocks into a plurality of bit planes (col. 11 lines 25-30, and col. 5 lines 14-23).

Venkatesan et al. does not explicitly disclose a digital watermarking unit that adjusts the ON/OFF state of significant bits such that the relation between information defined by N (N is an even number) significant bits Qnm.sub.j(x, y) (x=0, 1, . . . , y=0, 1, . . .) of the m.sub.j-th bit plane of the n.sup.th block and a natural number T satisfies either the ON state expressed by equation (3), or the OFF state expressed by equation (4), depending on whether the encoding hash value of the n.sup.th block is odd or even, in order to embed a digital watermark; and an encoding unit that encodes the set of quantized coefficients containing the ON/OFF adjusted significant bits and equations (3) and (4).

However Kamijoh et al. teaches a method that does not lose verification information, such as copyright information, embedded in image data, even when the image data are quantized for compression by using adjustment means for adjusting the value of the image data whose form has been changed and repeating the adjustment process until quantized values are not changed by

errors that are introduced through the predetermined process (see col. 1 lines 57-col. 2 lines 50, fig. 5 and element 332 of fig. 5, and equations 1-15) that reads on a digital watermarking unit that adjusts the ON/OFF state of significant bits such that the relation between information defined by N (N is an even number) significant bits Qnm.sub.j(x, y) (x=0, 1, . . . , y=0, 1, . . .) of the m.sub.j-th bit plane of the n.sup.th block and a natural number T satisfies either the ON state expressed by equation (3), or the OFF state expressed by equation (4), depending on whether the encoding hash value of the n.sup.th block is odd or even, in order to embed a digital watermark; and an encoding unit that encodes the set of quantized coefficients containing the ON/OFF adjusted significant bits and applicants equations 3 and 4.

Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention was made to modify the teachings of Kamijoh et al. within the system of Venkatesan et al. because they are analogous embedding information in a digital data using quantized coefficients. One would have been motivated to modify the teachings of Kamijoh et al. because it would provide durable digital watermark technique and/or embedded watermark would not be lost (see Kamijoh et al. col. 4 lines 6-10, and col. 1 lines 6-10).

Regarding claim 3 Venkatesan et al. discloses a code stream producing apparatus comprising:

a quantizer (fig. 4 element 450) that quantizes a frequency component obtained from a pixel value of an image through discrete wavelet transform to produce a set of quantized coefficients for each of a plurality of tiles of the image (col. 9 lines 45-60);

a block processing unit that divides the set of quantized coefficients into a plurality of blocks (col. 5 lines 14-23, and col. 6 lines 30-50);

a hash conversion unit that carries out hash conversion for each of the blocks, based on the quantized coefficients of the block, to obtain an encoding hash value for each of the blocks (col. 9 lines 2-53);

a bit plane defining unit that divides each of the blocks into a plurality of bit planes (col. 11 lines 25-30, and col. 5 lines 14-23).

Venkatesan et al. does not explicitly disclose a digital watermarking unit that adjusts the ON/OFF state of significant bits such that the relation between information defined by N (N is an even number) significant bits Qn.sub.im.sub.j(x, y) (x=0, 1, . . . , y=0, 1, . . .) of the m.sub.j-th bit plane of the n.sub.i-th block and a natural number T satisfies either the ON state expressed by equation (5), or the OFF state expressed by equation (6), depending on whether the encoding hash value of the n.sub.i-th block is odd or even, in order to embed a digital watermark; and an encoding unit that encodes the set of quantized coefficients containing the ON/OFF adjusted significant bits and equations (5) and (6).

However Kamijoh et al. teaches a method that does not lose verification information, such as copyright information, embedded in image data, even when the image data are quantized for compression by using adjustment means for adjusting the value of the image data whose form has been changed and repeating the adjustment process until quantized values are not changed by errors that are introduced through the predetermined process (see col. 1 lines 57-col. 2 lines 50, fig. 5 and element 332 of fig. 5, and equations 1-15) that reads on a digital watermarking unit that adjusts the ON/OFF state of significant bits such that the relation between information defined by N (N is an even number) significant bits Qn.sub.im.sub.j(x, y) (x=0, 1, . . . , y=0, 1, . . .) of the m.sub.j-th bit plane of the n.sub.i-th block and a natural number T satisfies either the

ON state expressed by equation (5), or the OFF state expressed by equation (6), depending on whether the encoding hash value of the n.sub.i-th block is odd or even, in order to embed a digital watermark; and an encoding unit that encodes the set of quantized coefficients containing the ON/OFF adjusted significant bits and applicants equations 5 and 6.

Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention was made to modify the teachings of Kamijoh et al. within the system of Venkatesan et al. because they are analogous embedding information in a digital data using quantized coefficients. One would have been motivated to modify the teachings of Kamijoh et al. because it would provide durable digital watermark technique and/or embedded watermark would not be lost (see Kamijoh et al. col. 4 lines 6-10, and col. 1 lines 6-10).

Regarding claim 13 Venkatesan et al. discloses an image processing apparatus that receives and decodes a compressed code stream, the apparatus comprising:

a decoding unit that decodes the code stream to produce a set of quantized coefficients (col. 5 lines 63-col. 6 lines 16);

a block processing unit that divides the set of quantized coefficients into a plurality of blocks (col. 5 lines 14-23, and col. 6 lines 30-50);

a decoding hash conversion unit that carries out hash conversion for each of the blocks, based on the quantized coefficients of the block, to obtain a decoding hash value for the block (col. 9 lines 2-53 and col. 5 lines 63-col. 6 lines 16);

a bit plane defining unit that analyzes the quantized coefficients of each of the blocks into bit planes (col. 11 lines 25-30, and col. 5 lines 14-23).

Venkatesan et al. does not explicitly disclose an unauthorized use detecting unit that determines whether an odd/even property represented by either an ON state, in which a relation between a natural number T and bit information defined by N (N is an even number) significant bits Qn.sub.im.sub.j (x, y) (x=0, 1, . . . , y=0, 1, . . .) of the m.sub.j-th bit plane of the n.sub.i-th block satisfies equation (7), or an OFF state, in which the relation between the natural number T and the bit information satisfies equation (8), matches an odd or even value of the decoding hash value of the n.sub.i-th block to detect unauthorized use and equations (7) and (8).

However Kamijoh et al. teaches a method that does not lose verification information, such as copyright information, embedded in image data, even when the image data are quantized for compression by using adjustment means for adjusting the value of the image data whose form has been changed and repeating the adjustment process until quantized values are not changed by errors that are introduced through the predetermined process (see col. 1 lines 57-col. 2 lines 50, fig. 5 and element 332 of fig. 5, and equations 1-15) that reads on an unauthorized use detecting unit that determines whether an odd/even property represented by either an ON state, in which a relation between a natural number T and bit information defined by N (N is an even number) significant bits Qn.sub.im.sub.j (x, y) (x=0, 1, . . . , y=0, 1, . . .) of the m.sub.j-th bit plane of the n.sub.i-th block satisfies equation (7), or an OFF state, in which the relation between the natural number T and the bit information satisfies equation (8), matches an odd or even value of the decoding hash value of the n.sub.i-th block to detect unauthorized use and applicants equations 7 and 8.

Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention was made to modify the teachings of Kamijoh et al. within the system of

Venkatesan et al. because they are analogous embedding information in a digital data using quantized coefficients. One would have been motivated to modify the teachings of Kamijoh et al. because it would provide durable digital watermark technique and/or embedded watermark would not be lost (see Kamijoh et al. col. 4 lines 6-10, and col. 1 lines 6-10).

Regarding claim 15 Venkatesan et al. discloses a code stream producing program installed in a computer to cause the computer to execute the procedures of:

dividing an image into a plurality of tiles (col. 5 lines 14-23, and col. 6 lines 30-50);

performing discrete wavelet transform on image data of each of the tiles to convert each of pixel values of the image to a frequency component (col. 5 lines 46-50);

quantizing the frequency components to produce a set of quantized coefficients (col. 9 lines 45-60);

dividing the set of quantized coefficients into a plurality of blocks (col. 9 lines 45-60);

performing hash conversion for each of the blocks, based on the quantized coefficients of the block, to obtain an encoding hash value for the block (col. 9 lines 2-53);

dividing each of the blocks into a plurality of planes (col. 5 lines 14-23, and col. 6 lines 30-50).

Venkatesan et al. fails to explicitly disclose adjusting an ON/OFF state of significant bits such that a relation between information defined by N (N is an even number) significant bits Qnm(x, y) (x=0, 1, . . . , y=0, 1, . . .) of the m.sup.th bit plane of the n.sup.th block and a natural number T satisfies either the ON state expressed by equation (1), or the OFF state expressed by equation (2), depending on whether the encoding hash value of the n.sup.th block is odd or even,

in order to embed a digital watermark; and encoding the set of quantized coefficients containing the ON/OFF adjusted significant bits and equations (1) and (2).

However Kamijoh et al. teaches a method that does not lose verification information, such as copyright information, embedded in image data, even when the image data are quantized for compression by using adjustment means for adjusting the value of the image data whose form has been changed and repeating the adjustment process until quantized values are not changed by errors that are introduced through the predetermined process (see col. 1 lines 57-col. 2 lines 50, fig. 5 and element 332 of fig. 5, and equations 1-15) that reads on adjusting an ON/OFF state of significant bits such that a relation between information defined by N (N is an even number) significant bits Qnm(x, y) (x=0, 1, . . . , y=0, 1, . . .) of the m.sup.th bit plane of the n.sup.th block and a natural number T satisfies either the ON state expressed by equation (1), or the OFF state expressed by equation (2), depending on whether the encoding hash value of the n.sup.th block is odd or even, in order to embed a digital watermark; and encoding the set of quantized coefficients containing the ON/OFF adjusted significant bits and applicants equations 1 and 2.

Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention was made to modify the teachings of Kamijoh et al. within the system of Venkatesan et al. because they are analogous embedding information in a digital data using quantized coefficients. One would have been motivated to modify the teachings of Kamijoh et al. because it would provide durable digital watermark technique and/or embedded watermark would not be lost (see Kamijoh et al. col. 4 lines 6-10, and col. 1 lines 6-10).

Regarding claim 16 Venkatesan et al. discloses a code stream producing program installed in a computer to cause the computer to execute the procedures of:

dividing an image into a plurality of tiles (col. 5 lines 14-23, and col. 6 lines 30-50);

performing discrete wavelet transform on image data of each of the tiles to convert each of a plurality of pixel values of the image to a frequency component (col. 5 lines 46-50);

quantizing the frequency components to produce a set of quantized coefficients (col. 9 lines 45-60);

dividing the set of quantized coefficients into a plurality of blocks (col. 5 lines 14-23, and col. 6 lines 30-50);

performing hash conversion for each of the blocks, based on the quantized coefficients of the block, to obtain an encoding hash value for the block (col. 9 lines 2-53);

dividing each of the blocks into a plurality of bit planes (col. 5 lines 14-23, and col. 6 lines 30-50).

Venkatesan et al. fails to disclose adjusting an ON/OFF state of significant bits such that a relation between information defined by N (N is an even number) significant bits Qnm.sub.j(x, y) (x=0, 1, . . . , y=0, 1, . . .) of the m.sub.j-th bit plane of the nth block and a natural number T satisfies either the ON state expressed by equation (3), or the OFF state expressed by equation (4), depending on whether the encoding hash value of the n.sup.th block is odd or even, in order to embed a digital watermark; and encoding the set of quantized coefficients containing the ON/OFF adjusted significant bits and equations (3) and (4).

However Kamijoh et al. teaches a method that does not lose verification information, such as copyright information, embedded in image data, even when the image data are quantized for compression by using adjustment means for adjusting the value of the image data whose form has been changed and repeating the adjustment process until quantized values are not changed by errors that are introduced through the predetermined process (see col. 1 lines 57-col. 2 lines 50, fig. 5 and element 332 of fig. 5, and equations 1-15) that reads on adjusting an ON/OFF state of significant bits such that a relation between information defined by N (N is an even number) significant bits Qnm.sub.j(x, y) (x=0, 1, . . . , y=0, 1, . . .) of the m.sub.j-th bit plane of the nth block and a natural number T satisfies either the ON state expressed by equation (3), or the OFF state expressed by equation (4), depending on whether the encoding hash value of the n.sup.th block is odd or even, in order to embed a digital watermark; and encoding the set of quantized coefficients containing the ON/OFF adjusted significant bits and applicants equations 3 and 4.

Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention was made to modify the teachings of Kamijoh et al. within the system of Venkatesan et al. because they are analogous embedding information in a digital data using quantized coefficients. One would have been motivated to modify the teachings of Kamijoh et al. because it would provide durable digital watermark technique and/or embedded watermark would not be lost (see Kamijoh et al. col. 4 lines 6-10, and col. 1 lines 6-10).

Regarding claim 17 Venkatesan et al. discloses a code stream producing program installed in a computer to cause the computer to execute the procedures of:

dividing an image into a plurality of tiles (col. 5 lines 14-23, and col. 6 lines 30-50);

performing discrete wavelet transform on image data of each of the tiles to convert each of a plurality of pixel values of the image to a frequency component (col. 5 lines 46-50);

quantizing the frequency components to produce a set of quantized coefficients (col. 9 lines 45-60);

dividing the set of quantized coefficients into a plurality of blocks (col. 5 lines 14-23, and col. 6 lines 30-50);

performing hash conversion for each of the blocks, based on the quantized coefficients of the block, to obtain an encoding hash value for the block (col. 9 lines 2-53);

dividing each of the blocks into a plurality of bit planes (col. 5 lines 14-23, and col. 6 lines 30-50).

Venkatesan et al. fails to disclose adjusting an ON/OFF state of significant bits such that a relation between information defined by N (N is an even number) significant bits Qn.sub.im.sub.j(x, y) (x=0, 1, . . . , y=0, 1, . . .) of the m.sub.j-th bit plane of the n.sub.i-th block and a natural number T satisfies either the ON state expressed by equation (5), or the OFF state expressed by equation (6), depending on whether the encoding hash value of the n.sub.i-th block is odd or even, in order to embed a digital watermark; and encoding the set of quantized coefficients containing the ON/OFF adjusted significant bits and equations (5) and (6).

However Kamijoh et al. teaches a method that does not lose verification information, such as copyright information, embedded in image data, even when the image data are quantized for compression by using adjustment means for adjusting the value of the image data whose form has been changed and repeating the adjustment process until quantized values are not changed by errors that are introduced through the predetermined process (see col. 1 lines 57-col. 2 lines 50,

fig. 5 and element 332 of fig. 5, and equations 1-15) that reads on adjusting an ON/OFF state of significant bits such that a relation between information defined by N (N is an even number) significant bits Qn.sub.im.sub.j(x, y) (x=0, 1, . . . , y=0, 1, . . .) of the m.sub.j-th bit plane of the n.sub.i-th block and a natural number T satisfies either the ON state expressed by equation (5), or the OFF state expressed by equation (6), depending on whether the encoding hash value of the n.sub.i-th block is odd or even, in order to embed a digital watermark; and encoding the set of quantized coefficients containing the ON/OFF adjusted significant bits and applicants equations 5 and 6.

Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention was made to modify the teachings of Kamijoh et al. within the system of Venkatesan et al. because they are analogous embedding information in a digital data using quantized coefficients. One would have been motivated to modify the teachings of Kamijoh et al. because it would provide durable digital watermark technique and/or embedded watermark would not be lost (see Kamijoh et al. col. 4 lines 6-10, and col. 1 lines 6-10).

Regarding claim 19 Venkatesan et al. discloses an image processing program installed in a computer and causing the computer to execute the procedure of:

receiving and decoding a compressed code stream to produce a set of quantized coefficients (col. 5 lines 63-col. 6 lines 16);

dividing the set of quantized coefficients into a plurality of blocks (col. 5 lines 14-23, and col. 6 lines 30-50);

carrying out hash conversion for each of the blocks, based on the quantized coefficients of the block, to obtain a decoding hash value for the block (col. 9 lines 2-53);

dividing the quantized coefficients of each of the blocks into a plurality of bit planes(col. 5 lines 14-23, and col. 6 lines 30-50).

Venkatesan et al. fails to disclose determining whether an odd/even property represented by either an ON state, in which a relation between a natural number T and bit information defined by N (N is an even number) significant bits Qn.sub.im.sub.j (x, y) (x=0, 1, . . . , y=0, 1, . . .) of the m.sub.j-th bit plane of the n.sub.i-th block satisfies equation (7), or an OFF state, in which the relation between the natural number T and the bit information satisfies equation (8), matches an odd or even value of the decoding hash value of the n.sub.i-th block to detect unauthorized use and equations (7) and (8).

However Kamijoh et al. teaches a method that does not lose verification information, such as copyright information, embedded in image data, even when the image data are quantized for compression by using adjustment means for adjusting the value of the image data whose form has been changed and repeating the adjustment process until quantized values are not changed by errors that are introduced through the predetermined process (see col. 1 lines 57-col. 2 lines 50, fig. 5 and element 332 of fig. 5, and equations 1-15) that reads on determining whether an odd/even property represented by either an ON state, in which a relation between a natural number T and bit information defined by N (N is an even number) significant bits Qn.sub.im.sub.j (x, y) (x=0, 1, . . . , y=0, 1, . . .) of the m.sub.j-th bit plane of the n.sub.i-th block satisfies equation (7), or an OFF state, in which the relation between the natural number T and

the bit information satisfies equation (8), matches an odd or even value of the decoding hash value of the n.sub.i-th block to detect unauthorized use and applicants equations 7 and 8.

Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention was made to modify the teachings of Kamijoh et al. within the system of Venkatesan et al. because they are analogous embedding information in a digital data using quantized coefficients. One would have been motivated to modify the teachings of Kamijoh et al. because it would provide durable digital watermark technique and/or embedded watermark would not be lost (see Kamijoh et al. col. 4 lines 6-10, and col. 1 lines 6-10).

Regarding claims 4 and 18 Kamijoh et al. discloses the code stream producing apparatus, wherein the digital watermarking unit carries out the ON/OFF adjustment of the significant bits in one of a first mode, in which the relation between the natural number T and the bit information defined by significant bits is adjusted to the ON state when the encoding hash value is odd and to the OFF state when the encoding hash value is even, and a second mode, in which the relation between the natural number T and the bit information defined by significant bits is adjusted to the ON state when the encoding hash value is even and to the OFF state when the encoding hash value is odd (col. 6 lines 65-col. 7 lines 25). The rational for combining are the same as claim 1 above.

Regarding claim 5 Venkatesan et al. discloses the code stream producing apparatus, further comprising a mode setting unit that selects one of the first and the second modes in a switchable manner, wherein the digital watermarking unit determines the ON/OFF state of the bit

information according to the selected mode (fig. 4).

Regarding claim 6 Venkatesan et al. discloses the code stream producing apparatus, wherein the mode setting unit selects one of the first and second modes based on the encoding hash value and a coordinate value of a currently processed quantized coefficient on the image (col. 8 lines 2-58).

Regarding claim 7 Venkatesan et al. discloses the code stream producing apparatus, wherein the mode setting unit selects one of the first and second modes based on the encoding hash value and externally input secret information (col. 9 lines 45-col. 10 lines 25).

Regarding claim 8 Venkatesan et al. discloses the code stream producing apparatus, wherein the encoding unit performs an encoding operation from a higher bit plane to a lower bit plane, and wherein all the associated bits in bit planes lower than a current bit plane to be processed are made OFF when turning an OFF bit into the ON state, and all the associated bits in the bit planes lower than the current bit plane are made ON when turning an ON bit into the OFF state (col. 11 lines 6-60).

Regarding claim 9 Venkatesan et al. discloses the code stream producing apparatus, further comprising a coefficient selecting unit that selects a part of the quantized coefficients, wherein the digital watermarking unit carries out the ON/OFF adjustment of the significant bits for the selected part of the quantized coefficients (col. 11 lines 6-60).

Regarding claim 10 Kamijoh et al. discloses the code stream producing apparatus, wherein the coefficient selecting unit selects one of the quantized coefficients that has a difference from an adjacent one of the quantized coefficients equal to or greater than a prescribed threshold value (fig. 5). The rational for combining are the same as claim 1 above.

Regarding claim 11 Venkatesan et al. discloses the code stream producing apparatus, wherein the threshold value is embedded in the quantized coefficients (col. 6 lines 30-50).

Regarding claim 12 Venkatesan et al. discloses the code stream producing apparatus, wherein the hash conversion unit carries out the hash conversion using at least one of externally input secret information, date information, and a manufacturing number of the code stream producing apparatus, in addition to the quantized coefficients (col. 6 lines 30-50).

Regarding claim 14 Venkatesan et al. discloses an image processing apparatus, further comprising an emphasizing display unit that emphasizes the block in which the odd/even property matches the odd/even characteristic of the decoding hash value when displaying a decoded image (fig. 8-9).

Regarding claim 20 Venkatesan et al. discloses the image processing program, further causing the computer to execute the procedure of: displaying a decoded image, while emphasizing a block location in which the odd/even property matches the odd/even characteristic of the decoding hash value (fig. 8-9).

Conclusion

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eleni A. Shiferaw whose telephone number is 571-272-3867. The examiner can normally be reached on Mon-Fri 8:00am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nasser R. Moazzami can be reached on (571) 272-4195. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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